VENOUS THROMBOSIS AND HYDROCELE OF THE INGUINAL CANAL.*

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CONSIDERING varicosities of the pampiniform plexus, the rarity of thrombosis in them is striking. In varicosities of the lower extremity and of the rectum clotting and inflammation are of frequent occurrence. In the rare instances in which I have seen a varicocele thus affected, the process has, for the most part, been limited to the distal radicals and always in close relationship to the testicles and the tunica vaginalis. In contra-distinction to these cases I beg to call attention to thrombosis of the spermatic vein occurring higher up and in the inguinal canal, and leaving intact the lower vein radicals.

The long course of the spermatic vein and the comparatively slight amount of blood, which in an auxiliary way flows from the testicle through the deferential vein, would seem to make it a favorable place for stagnation in the blood column and thrombosis. It would seem that by violent effort, by direct injuries or by pressure of a truss, thrombosis with its usual sequences would be of common observation. Either this is not the case, or the condition, if observed, may have seemed so trivial as not to have been deemed worthy of record. At least in my study of relevant literature I have found nothing bearing on the subject. Nevertheless in the last few years I have seen three distinct cases of thrombosis in the spermatic cord within the canal, each affecting an adult without varicocele. I beg to submit a brief history of the cases.

CASE I.—J. W. F., aged 43, married, and of excellent habits. Has no history of venereal disease or of hernia. After violent exercise at tennis he suddenly experienced very sharp pain in the groin attended with nausea and slight vomiting. When seen twenty-four hours after the onset there was some acceleration of the pulse rate and the temperature had risen to 102. After the third day the temperature had entirely subsided and continued normal. The first examination showed a very marked tenderness in the upper part of the scrotum, and the presence of a firm cylindrical swelling, evidently of the cord, extended into the inguinal canal; but failing by more than an inch to reach the epididymis. At the lower end a bifurcation of the induration could easily be felt. As far as it could be palpated the cord presented the feel of a thrombosed vein. Forty-eight hours after the onset, there developed a tenderness and a slight swelling of the epididymis, although the enlargement of the cord did not extend downwards. There was no enlargement of the external ring, nor could any impulse on coughing be elicited. Under purely expectant treatment and rest in bed, the condition gradually subsided, and in about ten days the restitution to the normal was complete.

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Case II.—S. G., aged 52, married. Has had several attacks of gonorrhea, the last one twenty-eight years ago. Has never had a hernia. He ascribes his condition to excessive golfing, but is not aware of having injured himself by any single violent effort. He presented himself at the office because of a dull pain in the groin, which had continued without abatement for one week. The pain was not severe enough to keep him from his work. There were no constitutional symptoms at any time. Through the thin abdominal wall the intra-canalous portion of the cord could be readily palpated. It was very tender to the touch, distinctly indurated and nearly as large as the little finger. Traced downward the induration could be felt in the upper part of the scrotum and was gradually lost in the lower part of the cord. Neither the testicle nor the epididymis was involved at any time. As in the previous case, the condition disappeared slowly in a little over three weeks.

Case III.—S. R., aged 49, widower. Has no history of venereal disease. He has had a reducible right inguinal hernia for many years, for which he has recently had a new truss fitted. To this he ascribes his present illness, which began with pain in the region of the hernia sufficiently severe to confine him to his bed. When first seen he had slight elevation of temperature and some malaise consequent thereon. There was some little nausea, but no vomiting. The bowels moved readily on slight stimulation. An examination showed the abdominal wall over the canal very much relaxed as one sees it after the long wearing of a truss. The hernial opening was large enough to readily admit the finger. It was empty but very tender. On my second examination, twenty-four hours later, there could be felt within it a tender cord running into the scrotum and not quite reaching the epididymis. During the next few days the latter became somewhat tender and sore. There was at no time any effusion into the tunica vaginalis. Three weeks in bed with rest sufficed to cause the induration in the cord to gradually disappear. Although more than a year has passed since the attack and the patient has continued wearing the truss, there has been no recurrence.

In each of these cases I have recently examined the spermatic cord and found it normal. While we are led to believe, and in the majority of cases it doubtless is true, that thrombosis of a vein recovers with the formation of a fibrous cord which remains, in these cases it is probable that by a process of liquefaction and absorption of the thrombus an entire restitution even to the calibre of the veins took place. In none of the cases was there any justification for operation, wherefore the clinical diagnosis of thrombosis of the spermatic vein might be questioned. In each of them an infective process could be positively excluded, and except in the third case a hernia did not exist. The slight participation of the testicle and the epididymis in the process and its secondary nature preclude even the suspicion of an ordinary epididymitis. All of the cases were on the right side.

With the exclusion of the most common etiological cause of thrombosis, namely, bacterial invasion, we must look to some mechanical obstruction or trauma from very violent muscular action as to the cause of the thrombosis in these cases. Whereas it is well known that even prolonged compression of a vessel as of the carotid artery in prevention of hemorrhage in major operations about the head is not followed by thrombosis, this condition is much more likely to arise in thin walled veins with their many small and irregular tributaries. It appears to me that the cases described are a mild type of the condition following torsion of the cord, to which attention has quite recently been directed. In torsion of the cord, however, the symptoms are exceedingly severe and associated with symptoms of abdominal shock. In 70 per cent. of the cases collected by Bochdaneck castration became imperative by reason of gangrene of the testicle. In the great majority of cases the diagnosis of torsion of the cord was not made, and the operations were for the most part performed under the belief that there existed a strangulated hernia.

Fortunately I have had two opportunities of verifying the diagnosis of thrombosis of the spermatic vein by operation.

CASE IV.—J. C., aged 38, admitted to the Cincinnati Hospital, January 21, 1899. Has had a previous history of malaria. On January 9th while working on a flat car unloading timber, a jack-block struck him in the groin. He was knocked off the car, but did not lose consciousness at any time. With assistance he was enabled to walk to his home. Twenty-four hours after the injury was sustained, he noticed a swelling in the left groin and severe paroxysmal pains. The bowels moved regularly and there was no nausea nor vomiting at any time. He remained in bed for about two weeks, during which he states the swelling diminished and the pain in the groin abated somewhat.

Examination negative except for local condition. Over the abdomen there is a bluish-green discoloration of the skin near the anterior superior spinous process. This is evidently the result of a superficial ecchymosis. The left testicle hangs much lower than the right. In the cord for about two inches distinct irregular thickenings of the vein can be felt. The ring distinctly patulous admits the finger which comes in contact with a hard circumscribed swelling an inch or more long. It is of a diameter of the little finger and appears to have a distinct impulse on coughing. The cord feels like a thrombosed vein.

Operation January 23, 1899. General anesthesia. Incision over the external abdominal ring extending into the scrotum. Easy exposure of the thrombosed vein. The further steps of the operation consisted of splitting the aponeurosis of the external abdominal oblique and thorough exposure of the contents of the inguinal canal. In this there was found an unoccupied narrow vaginal prolongation of the peritoneum and underneath it the cord with the vas deferens hidden from view by the thrombosed vein which extended quite into the internal ring. The thrombosed part of the vein, irregular in diameter and about two inches long, was resected. The operation was completed as an ordinary Bassini. The patient made an uninterrupted recovery and was discharged February 16, 1899.

This case was the nearest approach I have seen to a hernia resulting from a direct injury. The presence of a partly open peritoneal process directs attention to the possibility of an effusion into it as a result of the thrombosis, if the later had not been relieved by operation. When this process does not exist, a hydrocele within the canal can probably not develop. But in the presence of such a process, a thrombosis might, as in the following cases, be followed by a hydrocele of the cord, which, because of its rapid growth, might, and doubtless does, overshadow its cause, namely, a thrombosed vein.

CASE V.—Father M. K., aged 59, parochial priest. Was first seen November 24, 1906. For eight years he has had a right reducible inguinal hernia for which he has worn a truss. Ten days ago there appeared in the right inguinal canal a hard tender mass which has prevented him from wearing the truss. Notwithstanding this the rupture has not descended. Within the last two days a second swelling causing much pain appeared in the upper part of the scrotum.

Physical examination shows a well nourished man, well except for local condition. On inversion of the scrotum an irregular nodular tumor can be felt in the inguinal canal which is very firm and rather tender. Below this in the upper part of the scrotum, there is a swelling as large as a plum of uniform outline and very sensitive. The tip of the finger passed through the inguinal canal above the upper swelling readily enters the abdomen and an impulse on coughing can be readily felt. The diagnosis of thrombosis with secondary cyst formation in the cord was made.

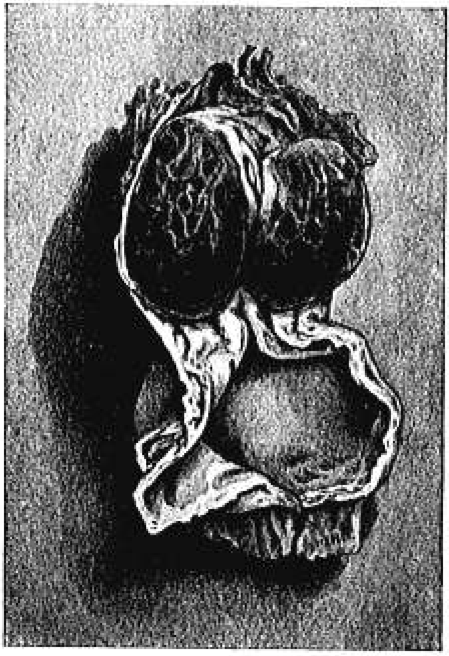
Operation at the Good Samaritan Hospital, December 1, 1906. On splitting the aponeurosis of the external oblique as in the ordinary hernia, there was exposed in the cord a thrombus in process of organization. The vein above the thrombus was patulous. The clot measured an inch and a quarter in length and three quarters of an inch in width. It was of dark red color and of uniform consistence and outline. Below it there was a hydrocele of the cord containing perfectly clear fluid and with a sac of uniform surface and clothed with endothelium. (Fig. 1.) The hernial protrusion of the peritoneum was separated by a considerable interval from the uppermost portion of the thrombus. The thrombus and hydrocele of the sac were easily excised, and the hernia treated in the ordinary way. Recovery was uninterrupted. There has been no recurrence either of the hernia or of the hydrocele.

Case VI.—Miss R. F., aged 28. Entered the Jewish Hospital, February 18, 1901. Has been well until four months ago, when after a severe strain she felt considerable pain in the right inguinal region. Although it caused her to limp some, it did not keep her from her work as a saleslady. She had quite forgotten this seemingly trifling condition, when about the first of December she noticed a swelling in the groin which gradually increased in size and without any special symptoms. When lying down it disappeared. A physician was consulted who advised the wearing of a truss. She continued to wear this for about two weeks without benefit.

Physical Examination.—Well developed young woman, in excellent health except for the local trouble. Occupying the upper part of the right labium majus and the inguinal canal, there is a rounded swelling with long axis parallel to Poupart's ligament. Above the latter nearly to the superior spinous processes a marked fulness is perceptible. On lying down the swelling of the labium disappears either spontaneously or on pressure, and the examining hand on the abdomen can readily feel the distension of the upper portion of the sac. A distinct impulse on coughing exists. With the patient standing, the translucency of the labial part of the sac is easily demonstrable.

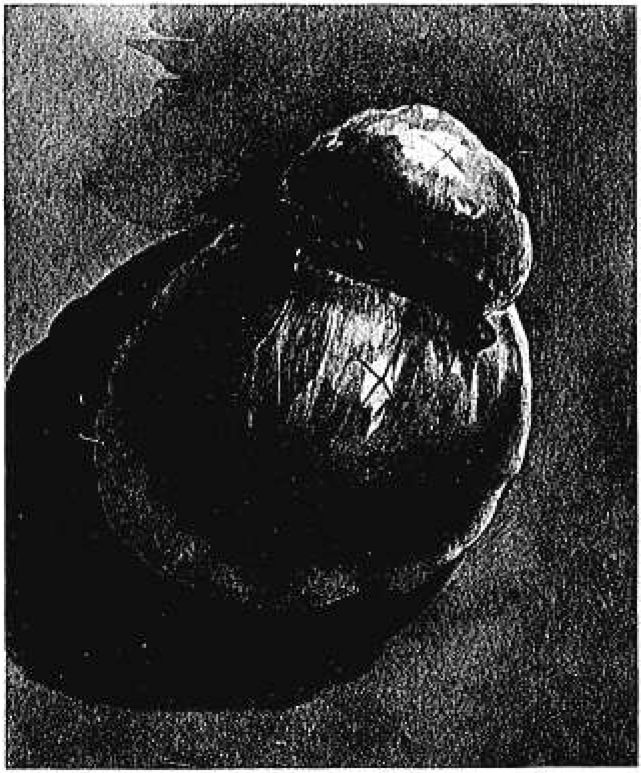
The diagnosis of hydrocele of the round ligament was made.

Fig. 1.



Thrombus of spermatic vein. Sac below. (Case 5)

FIG. 2.



Bilocular cyst of round ligament; Thrombus. Larger part of sac intraparietal. (Case 6.)

The operation was performed on February 19, 1901. The sac was easily exposed and appeared lobulated by reason of its constriction at the ring. The labial portion of the sac was easily enucleated. The intra-parietal portion, however, was deeply adherent to the parietal peritoneum from which, however, it was dissected without wounding the latter. Its firmest connection was with the round ligament where a firm reddish cord, still seen in the specimen, may have been what remained of the thrombosed vein. (Fig. 2.) After the operation, the cyst which appeared bilocular before, was shown to be unilocular. It was very thin walled and evidently of the round ligament. The operation was concluded as an ordinary hernia.

That the obstruction and thrombus formation is oftener in an omental vein than the spermatic is evident from the relative frequency with which cysts are found in connection with irreducible hernias. A mass of omentum adherent at the neck of the sac, or an obstructed appendix will not infrequently be found associated with the separation of a part of the hernial sac from the larger portion above and the effusion into it of a serous liquid. What comes on in a rapid way in a strangulated omental hernia during the first few hours is of slow development in these chronic cases. In the latter there is never any admixture of the fluid with blood. Quite recently I saw a young man with a hernia which had been retained by a truss. A few weeks before he came for observation a rather large swelling formed just without the external ring. It was as large as the end of the thumb, smooth in outline and ovoid in shape. It was distinctly translucent and irreducible. In the inguinal canal there could be felt an irregular mass seemingly a protruded fold of omentum which had become adherent.

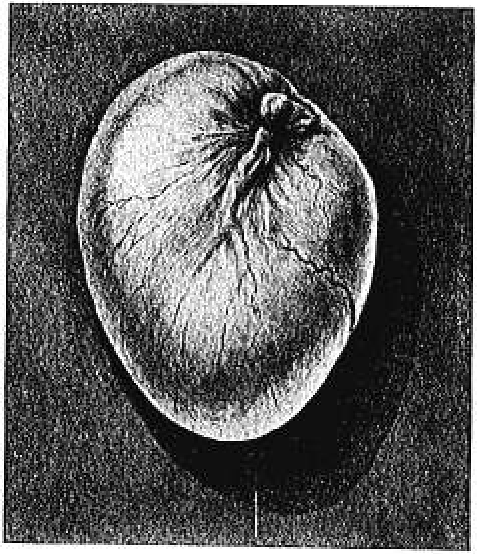
In contradistinction to these cases of cysts of the inguinal canal and of the upper portion of the spermatic cord, which in my judgment are the result of either venous obstruction or of thrombosis, are the cases in which the history of trauma or of a pre- or co-existing hernia cannot be obtained. These are cases in which the cysts of the spermatic cord or of the round ligament develop quickly, and at times with symptoms violent enough to suggest a hernial strangulation.

An analysis of the cases which have come under my observation and of which I have four specimens, shows them to be thin walled, lined with a flattened epithelium and containing a clear fluid, characteristic of the ordinary hydrocele (Fig. 3). The question arises whether in cases of ordinary hydrocele of the cord anything else can enter as an etiological factor than the embryonic rests of the vaginal process from the peritoneum through which the testicle descends or the round ligament passes.

So far as I know, the theory that these cysts may be overgrowths from vestiges of the Wolffian bodies, has nothing to support it. It is questionable, too, whether a hydrocele can occur in the cellular tissue of the cord or of the round ligament, without any preëxisting virtual cavity such as a partly obliterated vaginal process. In women particularly it has been questioned whether a hydrocele of the canal of Nuck is an anatomical possibility. The studies of a number of German anatomists seem to have established the existence of such a process. Although its patulousness is far less common than it is in male children, Bergmann found it open along its entire length in five and partly so in twelve subjects between one month and three years old. Furthermore, it is unusual for cysts, except as a result of trauma, to develop in cellular tissue. The analagon of a hydrocele in the neck is nearly always a branchial cyst. Cysts in the inguinal canal, unless formed in a sequestered portion of the sac of a hernia, with or without thrombosis as an etiological factor, are practically always the result of an exudation into the preëxisting unobliterated portion of the vaginal process. That most of these cases occur in the young is explained on this basis. That it may occur in the old is shown by the following case:

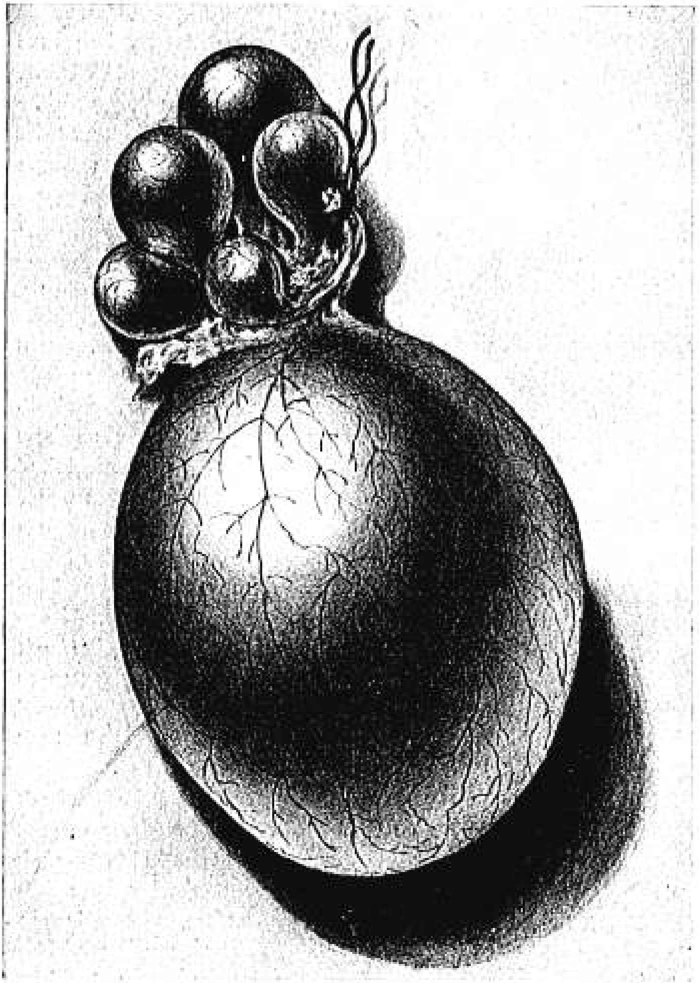
CASE VII.—D. L., male, aged 61, was well until a year ago when there appeared a swelling in the right inguinal region. With ordinary symptoms of a reducible hernia there gradually

FIG. 3.



Simple cyst of the spermatic cord. (Scrotal.)

FIG. 4.



Conglomerate inguinal cyst of the spermatic cord (Case 7.)

developed an irregular growth in the inguinal canal and projecting into the scrotum. For about six months before the patient came under my observation the mass had become irreducible.

Physical Examination.—Very well preserved and rugged man without other blemish than the local condition referred to. Occupying the region of the inguinal canal and the upper part of the scrotum there is an irregular mass elastic to the touch and presenting a distinct impulse on coughing. It was entirely irreducible. Because of the ease with which the mass was shown to be translucent, the diagnosis of hydrocele of the cord was made. The operation at the Good Samaritan Hospital March 28, 1898, revealed a cyst conglomerate extending within the abdominal cavity and pushing the peritoneum before it. (Fig. 4.) The individual cysts varied in size from a peach to a bean, but did not communicate with each other. They were filled with a particularly clear fluid and were lined with the flattened endothelium of serous sacs. The operation was completed as an ordinary hernia.

It is impossible to state what, without the history of an injury, could have caused an effusion into these embryonic peritoneal rests after more than sixty years of an innoxious desuetude. A case has been recorded by Cenas (quoted by Broca) in which during an attack of acute articular rheumatism a hydrocele of the spermatic cord developed which completely subsided with the disappearance of the general infection. My patient did not have rheumatism.

It is rather difficult to account for the multilocular development of the cyst in the case presented. It is not unlikely that vestiges of the vaginal process, irregularly distributed along the cord, developed simultaneously into separate cysts without communicating with each other or with the general peritoneal cavity. It is characteristic of a true hydrocele of the spermatic cord that it has not any communication with the peritoneal cavity in contradistinction to the open hydrocele, which rapidly or slowly may empty itself into the abdomen and disappears. A seeming reduction of the tumor into the abdomen may take place in the true hydrocele of the cord or round ligament, when as in case six a large portion of the cyst is above the internal ring and yet on the outside of the peritoneum between it and the muscular portion of the abdominal wall in front. These are the so-called bilocular hydroceles, a part of which appears in the labium or the upper portion of the scrotum and the other portion above the internal ring, and yet separated from the abdominal cavity by an intact peritoneum. It appears that in these cases by the upward growth of the true cyst, the parietal peritoneum is dissected away from the anterior wall in front much as it is in the intra-parietal forms of hernia. Indeed, in many of the cases of bilocular hydrocele hitherto recorded, there has been found, as in properitoneal hernias, some anomaly of position of the testicle. Diverticula of the vaginal process added to the great mobility and ease of displacement of the peritoneum about the internal ring, will readily account for the disappearance of the bilocular inguinal hydrocele. Its appearance during early life and in the young supports the view that in many cases there is an anatomical congenital anomaly as a basic factor.

In the above considerations, cysts of the lower part of the cord and those in conjunction with the testicle have not been considered. Like the organ of Giraldes, an embryonal rest of the Wolffian body, cysts may develop in connection with the upper part of the epididymis from this structure. They never, however, extend to the inguinal canal and are closely fixed to the testicle.

Nor has more than reference been made to the cysts of the inguinal canal and the upper part of the scrotum, which are due to the sequestration of a portion of a hernial sac and the accumulation within it of a serous transudate. The condition of a hydrocele in a part of a hernial sac is often enough encountered and thoroughly understood.

The diagnosis of thrombosis and of hydrocele of the cord within the inguinal canal and projecting beyond the external ring ought under ordinary circumstances present no difficulties. In the cases of thrombosis above described the diagnosis was easily made, and in the hydroceles which followed or developed without preëxisting thrombosis, the light test sufficed to clear up any doubt which might have existed. Nevertheless, thrombosis of the spermatic veins and an acute hydrocele may set on with such severity of symptoms as to simulate almost in every particular a strangulated hernia. In exceptional cases too, a differential diagnosis between thrombosis of the cord and thrombosis of an omental protrusion cannot be positively made until the parts are exposed by operation. Fortunately in either event an error in diagnosis would only accrue to the benefit of the patient in that an early operation would be insisted upon and probably performed.

The treatment of the conditions under consideration is simple enough. In the milder cases of thrombosis, expectant treatment is indicated. In those of larger dimensions following a trauma or in which from the size of an hematocele a positive diagnosis from hernia cannot be made, an operation is indicated. In hydroceles the older methods of aspiration and of injection have been rightly discarded. Complete excision of the sac is the only advisable procedure. Although in a considerable proportion of cases (as in the bilocular) the enucleation would involve the properitoneal space, the operation does not present insurmountable difficulties. In hydroceles resulting from sequestration of a portion of the sac, the operative treatment is that of an ordinary hernia. It is almost needless to conclude with the injunction that the operation, when complete, must leave the inguinal segment of the abdominal wall as competent to resist pressure as after the ordinary hernia operation.